Updated county-level distribution records for Wisconsin short-horned grasshoppers (Orthoptera, Acrididae and Romaleidae)

Mathew L. Brust[1], Charles Bomar[2], Alexander J. Harman[3]

1 Department of Biology, Chadron State College, 1000 Main Street, Chadron, NE 69337 USA.
2 University of Wisconsin-Stout, 6496 187th Street, Chippewa Falls, WI, 54729 USA.
3 Department of Entomology and Plant Pathology, Oklahoma State University, 127 Noble Research Center, Stillwater, OK, 74078 USA.

Corresponding author: Mathew L. Brust (mbrust@csc.edu)

Academic editor: Hojun Song | Received 2 April 2024 | Accepted 20 October 2024 | Published 15 April 2025

https://zoobank.org/FF5FAD19-DF85-4178-AB37-4524CF2B08CF

Citation: Brust ML, Bomar C, Harman AJ (2025) Updated county-level distribution records for Wisconsin short-horned grasshoppers (Orthoptera, Acrididae and Romaleidae). Journal of Orthoptera Research 34(1): 143–149. https://doi.org/10.3897/jor.34.124604

Abstract

The last update to the Wisconsin county-level distribution records for Wisconsin short-horned grasshoppers (Orthoptera: Acrididae and Romaleidae) was in 2005. Since then, the first author has done periodic collecting and photography in Wisconsin and has acquired a significant number of new county records. In addition, new online resources such as BugGuide and iNaturalist have become useful and mostly reliable sources of data. Using this combination of sources, we have compiled 99 new county records, increasing the number of county records by at least 20% for the following species: *Dendrotettix quercus* (Packard) (9 to 14), *Dichromorpha viridis* (Scudder) (14 to 23), *Melanoplus fasciatus* (Walker) (11 to 17), *Melanoplus scudderi* (Uhler) (3 to 5), *Melanoplus viridipes* Scudder (23 to 33), *Melanoplus walshii* Scudder (20 to 27), *Stethophyma lineata* (Scudder) (3 to 4), and by over 50% for *Melanoplus punctulatus* (Scudder) (10 to 30). In addition, a species new to Wisconsin, *Melanoplus gracilis* (Bruner), was photographed in three counties between 2020 and 2024. These examples suggest that some grasshopper species are likely overlooked in the state, particularly those associated with woodlands.

Keywords

biodiversity, Midwest, state, updates

Introduction

The "Guide to the Grasshoppers of Wisconsin" (Kirk and Bomar 2005) was published in 2005 and, at the time, was the only comprehensive published record of grasshopper (Orthoptera, Acrididae and Romaleidae) species distributions across the state of Wisconsin. The first author, in conjunction with Terrell Hyde (Department of Natural Resources, Bureau of Natural Heritage Conservation), compiled occurrence records used by Kathy Kirk and Charles Bomar to create the maps in Kirk and Bomar (2005). These data were then used to create an updated database for Wisconsin grasshoppers. This database has been used to manage the county records for the state. Unfortunately, in most cases, the data from Kathy Kirk's dataset were very limited, in most cases only providing the county and the year of collection as that was the extent of the information associated with the museum specimens.

Since 2005, a significant amount of collecting has occurred in the state, especially by the first and third authors. Online sources such as BugGuide and iNaturalist were also significant sources of data. In total, we present 99 new county records and one new state record for Wisconsin short-horned grasshoppers.

Methods

The first and third authors typically visit Wisconsin for one to three weeks each summer and obtain new records each year. These times have varied from one year to the next, tending to favor finding different species each year. Collections by the authors were made primarily by visual searches and collecting specimens with an aerial net. The second author lives in west-central Wisconsin and travels extensively in northern Wisconsin. Online citizen science sources such as BugGuide (https://bugguide.net/) and iNaturalist (https://www.inaturalist.org/) have also provided an enormous amount of new distributional data. On both websites, users submit photos of insects, or other organisms, as well as the date and location that the photos were taken, which allows the initial identification to be verified and improved if necessary. The species identifications on BugGuide are generally dependable because only the editors of the site are able to move images between taxa and the site is heavily frequented by insect taxonomists. The accuracy of grasshopper species identification on iNaturalist varies widely, and misidentified specimens are abundant. Because of this, the first author examined entries on iNaturalist and only accepted new county records where species identification is conclusive based on a variety of visible structures. From both websites, records of all specimens from any year up to 2024 were considered for inclusion. Identifications were made using a variety of sources,

Copyright *Mathew L. Brust et al.* This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

including Otte (1981, 1984) and Pfadt (2002). The first author has identified tens of thousands of rangeland grasshopper specimens from sweep net samples across Nebraska for approximately 20 years and has come to use some visual characteristics that have not been published. Specimens collected by the first author (most of the collections in this study) are deposited in the invertebrate collection at Chadron State College in Chadron, Nebraska. The maps included in this manuscript were created using Microsoft Paint.

Results

Between 2005 and 2023, a total of 99 new county records for 28 of Wisconsin's 72 previously recorded species were obtained, in addition to one new state record for *Trimerotropis pallidipennis* (Burmeister, 1838), which was obtained in 2022 (Brust 2023). The state record for *T. pallidipennis* was reported in Brust 2023 and is thus not being reported as a new state record here. However, *Melanoplus gracilis* (Bruner, 1876) was photographed in three counties in 2020 and 2021 and is reported here as a new state record. A male specimen of *T. pallidipennis* was collected in Price County, approximately 6.5 km (4 mi.) east of Fifield, on 3 June 2022. This record represents a northeastern occurrence of over 600 km (370 mi.) from its nearest previously known occurrence. We have increased the number of county records by at least 20% for the following species: *Dendrotettix quercus* (Packard, 1890) (9 to 14), *Dichromorpha viridis* (Scudder, 1862) (14 to 23), *Melanoplus fasciatus* (Walker, 1870) (11 to 17), *Melanoplus scudderi* (Uhler, 1864) (3 to 4), *Melanoplus viridipes* Scudder, 1897 (23 to 33), *Melanoplus walshii* Scudder, 1897 (20 to 26), *Stethophyma lineata* (Scudder, 1862) (3 to 4), and by over 50% for *Melanoplus punctulatus* (Scudder, 1863) (10 to 29).

Discussion

Of the eight species for which the number of county records was increased by at least 20%, one is associated with wetlands and seven occur in woodlands or along woodland edges. Of the seven woodland-associated species, two are arboreal, spending most of their time in the canopy. In addition, several other woodland species, as well as some very small species, are likely far more widespread than records suggest. In particular, *Melanoplus islandicus* Blatchley,1898 likely occurs across most of the northern half of Wisconsin among small woodland openings, and *Melanoplus dawsoni* (Scudder, 1875) likely also occurs across most of the northern half of Wisconsin in meadows and along woodland edges. Both are very small and mostly flightless species that are not easily noticed. Examples of the species discussed in this and the following paragraphs are shown in Figs 1–5.

These habitat specializations may help to explain the comparative lack of previous records for these species. In general, grasshopper species with economic or agricultural importance are the focus of diversity studies, while those with little or no economic or agricultural importance tend to be overlooked. Particularly, acridid species not associated with agricultural habitats are frequently ignored, leaving much room for further study. In Nebraska, Brust et al. (2008) acquired eight new state records of Acridid species in just three years, mostly by sampling over a broad temporal period each season and sampling in habitats other than grassland or agricultural areas. These authors list several reasons for species being previously overlooked, including habitat specialization, preference for habitats other than rangeland (grassland), early or late seasonal adult activity, and identification difficulties.

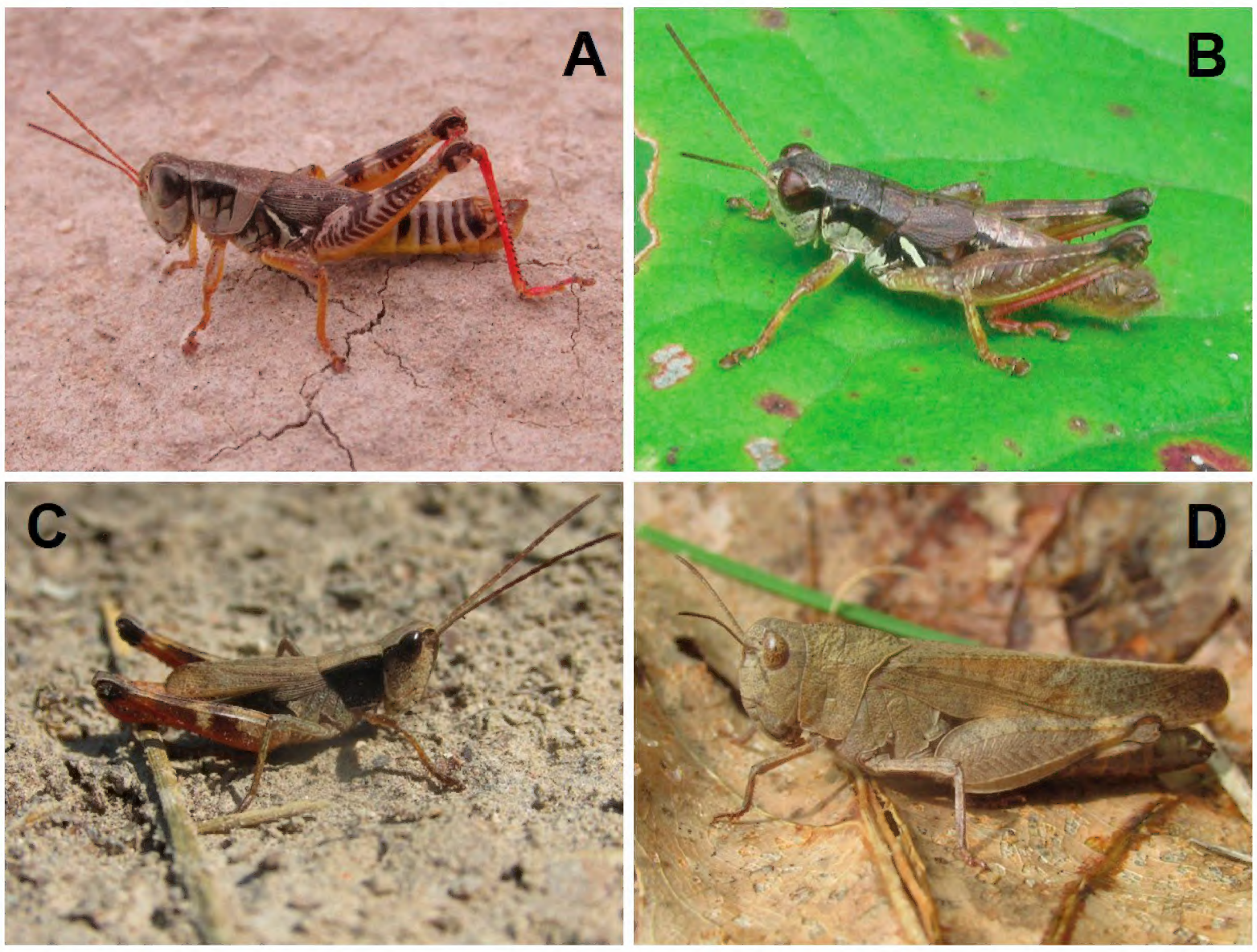

Fig. 1. A. *Melanoplus dawsoni*, male, photographed in Dawes County, Nebraska on September 8, 2029; **B.** *Melanoplus islandicus*, male, photographed in Marinette County, Wisconsin on July 29, 2021; **C.** *Chloealtis conspersa*, male, photographed in Dawes County, Nebraska on August 4, 2020; **D.** *Arphia sulphurea*, female, photographed in Washington County, Wisconsin on June 16, 2018.

While several grasshopper species likely occur in every Wisconsin county, this is not evident in the current records. These grasshopper species are generalists that are often common where they occur and that utilize a variety of habitats or occur in habitat types that are abundant throughout Wisconsin. Such habitats include roadsides, driveways, disturbed areas, edges of agricultural fields, woodland edges, and gardens. These species also appear to be host-plant generalists, which allows them to adapt to a variety of food sources. Species that likely occur in every Wisconsin county include *Arphia sulphurea* (Fabricius, 1781), *Chloealtis conspersa* (Harris, 1841), *Chortophaga viridifasciata* (De Geer, 1773), *Dissosteira carolina* (Linnaeus, 1758), *Melanoplus bivittatus* (Say, 1825), *Melanoplus femurrubrum* (De Geer, 1773), *Melanoplus sanguinipes* (Fabricius, 1798), and *Pseudochorthippus curtipennis* (Harris, 1835). At least one member of the *Melanoplus viridipes* species group likely occurs in every Wisconsin county. However, there are at least two different species (*Melanoplus viridipes* and *Melanoplus benni* Otte, 2002) in this group in Wisconsin that can be challenging to identify to species. Although still known in Wisconsin from relatively few counties, it is also likely that *Melanoplus punctulatus* (Scudder) occurs in every county. Brust and Harman (2020) discussed the behavior of this species and why its arboreal nature likely causes it to go unnoticed in many areas. It is unclear why woodland grasshopper species such as *M. punctulatus* often go unnoticed by collectors but are frequently photographed and posted on citizen science sites. In any case, these instances show the usefulness of citizen science sites in obtaining regional distribution data. However, as previously mentioned, such resources must be used with caution.

In the near future, some taxonomic changes are likely for at least a few Wisconsin grasshoppers. The status of *Melanoplus foedus fluviatilis* Bruner, 1897 continues to be debated. This taxon is currently treated as a subspecies in the Orthoptera Species File (Cigliano et al. 2024), but Brust et al. (2010) determined it to be an ecotype of *Melanoplus foedus* Scudder, 1878 rather than a subspecies. David Ferguson, who oversees grasshopper identification on BugGuide, gives a number of reasons why he lists this grasshopper as a full species on that website (*Melanoplus fluviatilis* Bruner, 1897). There are significant differences between *M. foedus foedus* and *M. foedus fluviatilis* in habitat preference, flight behavior, plant associations, coloration and surface texture, and body measurements (pers. obs., David Ferguson, pers. comm. February 2024). In addition, even in places where these two forms co-occur, no visible evidence of hybrid individuals has been found (pers. obs., David Ferguson, pers. comm. February 2024). While the genetic analysis in Brust et al. (2010) showed a significant amount of hybridization among *Melanoplus packardii* Scudder, 1878, *Melanoplus feodus foedus* Scudder, and *M. foedus fluviatilis*, several lines of evidence suggest that *M. foedus fluviatilis* is likely a full species. For example, apparent intergrades or hybrids (depending on taxonomic status) between the two subspecies are extremely rare, the two subspecies almost never occur in the same habitats, and the two subspecies appear to have different diets, with *M. foedus fluviatilis* appearing to be a specialist on sandbar willow (*Salix interior* Rowlee) as it is most often found in close association with this plant. *Melanoplus foedus foedus* has been recorded to feed on over 50 different plant species (Uekert and Hansen 1971, Banfill and Brusven 1973, Joern 1985, Pfadt 2002).

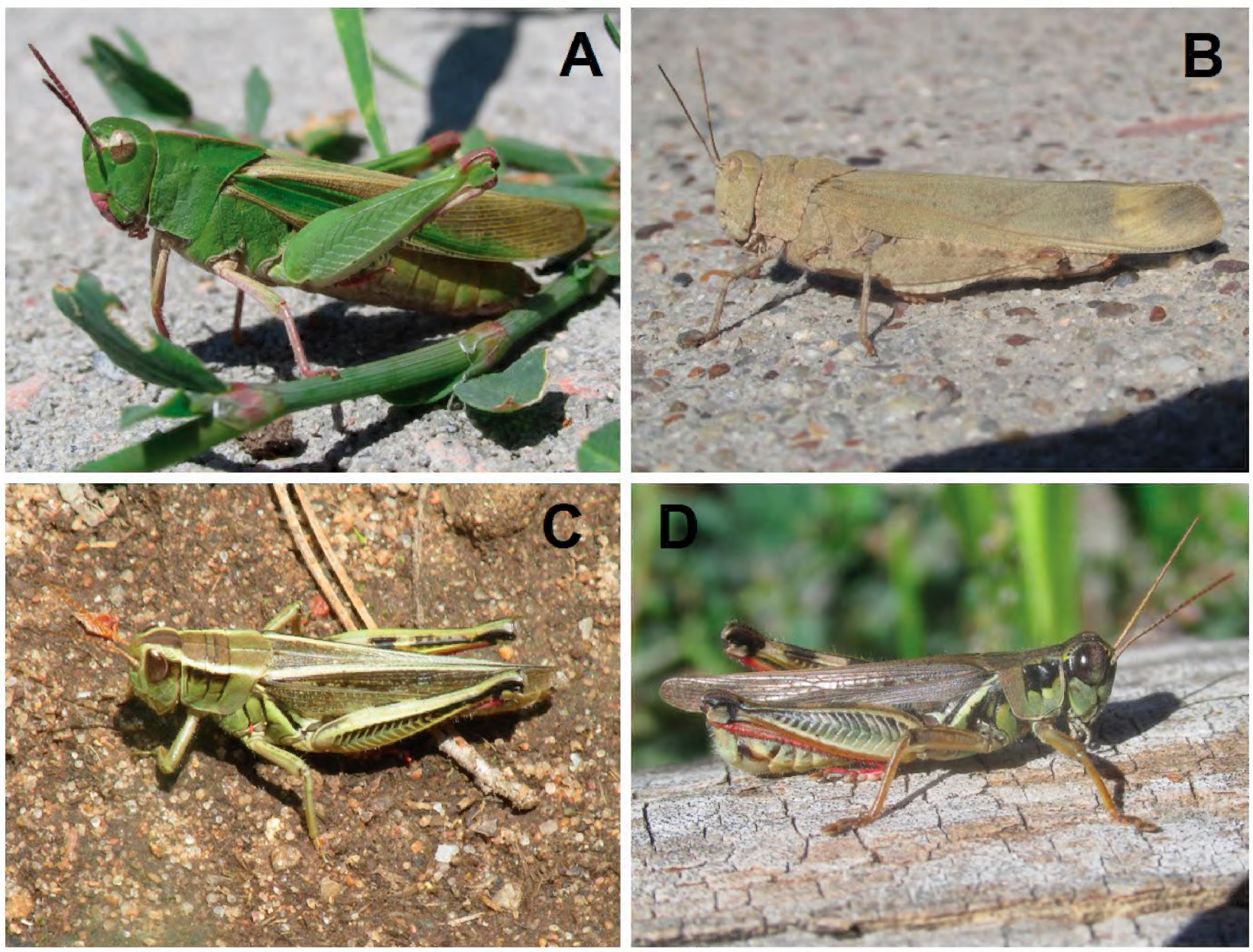

Fig. 2. A. *Chortophaga viridifasciata*, female, photographed in Dawes County, Nebraska on June 14, 2021; **B.** *Dissosteira carolina*, female, photographed in Dawes County, Nebraska on September 15, 2018; **C.** *Melanoplus bivittatus*, female, photographed in Marinette County, Wisconsin on July 17, 2023; **D.** *Melanoplus femurrubrum*, male, photographed in Dawes County, Nebraska on October 7, 2017.

What is currently considered *Hesperotettix viridis* (Thomas, 1872) in Wisconsin may actually be a different species. The *H. viridis* from Wisconsin are all undoubtedly *Hesperotettix viridis pratensis* Scudder, 1897. This species has historically been found at various locations in the western half of Wisconsin. Recent studies suggest that *H. viridis pratensis* may actually be a different species from *Hesperotettix viridis viridis* (Thomas, 1872). Sword et al. (2007) found significant genetic differences between individuals within the same species, but they also found that these differences correlated with host plant association. Furthermore, the first author has found these subspecies co-occurring in many areas in western Nebraska, often in the same pasture, yet there is virtually no evidence of introgression and each appears to feed on different host plants. Current research on the genus *Hesperotettix* strongly suggests that *H. viridis viridis* and *H. viridis pratensis* are separate species (JoVonn Hill, pers. comm. February 2024).

Unfortunately, it is likely that one grasshopper species has been extirpated from Wisconsin, and extirpation is a possible explanation for the lack of recent records for another species: *Pardalophora haldemanii* (Scudder, 1872) has not been found in Wisconsin in over 50 years. Across the Great Plains region, this is a grassland species, preferring mixed-grass environments. Its population densities appear to fluctuate erratically from year to year, and outbreaks of significant economic importance have been recorded at least once in Nebraska (Brust et al. 2008), while in other years it can be comparatively rare and localized (Brust pers. obs.). Species with this life history can be expected to require large contiguous grassland tracts or many grassland tracts with broad connectivity for populations to survive long term. Most of Wisconsin's grassland areas have become either limited in size and isolated over time or have been heavily invaded by invasive grasses (Wisconsin Prescribed Fire Council 2018). Thus, it is possible, and perhaps likely, that this species has been lost from the state due to the combination of these factors.

A few species recorded from Wisconsin are suspect or require further discussion. Here, each species will be discussed separately as each represents a unique case. Three are southern species, and one is common across much of the western United States. While there are two Wisconsin records for *Romalea microptera* (Beauvois, 1817), both from before 1980, these are not mentioned in Kirk and Bomar (2005). The current native range of this species almost reaches southern Missouri and Virginia. This species is flightless and not known to migrate long distances (University of Florida Entomology and Nematology Department 2021). It is likely that the two Wisconsin records are specimens that escaped from captivity, as this large grasshopper is commonly used for teaching and can readily be purchased live. It should not be considered to have viable populations in the state.

Paratylotropidia brunneri Scudder, 1897 is perhaps the most enigmatic Acridid species in Wisconsin. This species has a relatively limited distribution from western Oklahoma to northwestern Alabama north through eastern Kansas and into southeastern Nebraska as well as Missouri, western Tennessee, Kentucky, and Illinois. The single Wisconsin record from Jackson County in 1976 is over 400 km (250 mi.) north of the next nearest record (iNaturalist 2024). This species is usually flightless, with most individuals having short wings, although some individuals have relatively long wings (Rehn and Rehn 1943). Long-winged (macropterous) individuals do not appear to be strong fliers, so it is highly unlikely that the specimen represents a dispersing individual. In most areas, it is associated with tallgrass prairies, xeric limestone prairies, or the edges of woods at the fringes of grasslands (Brust et al. 2008,

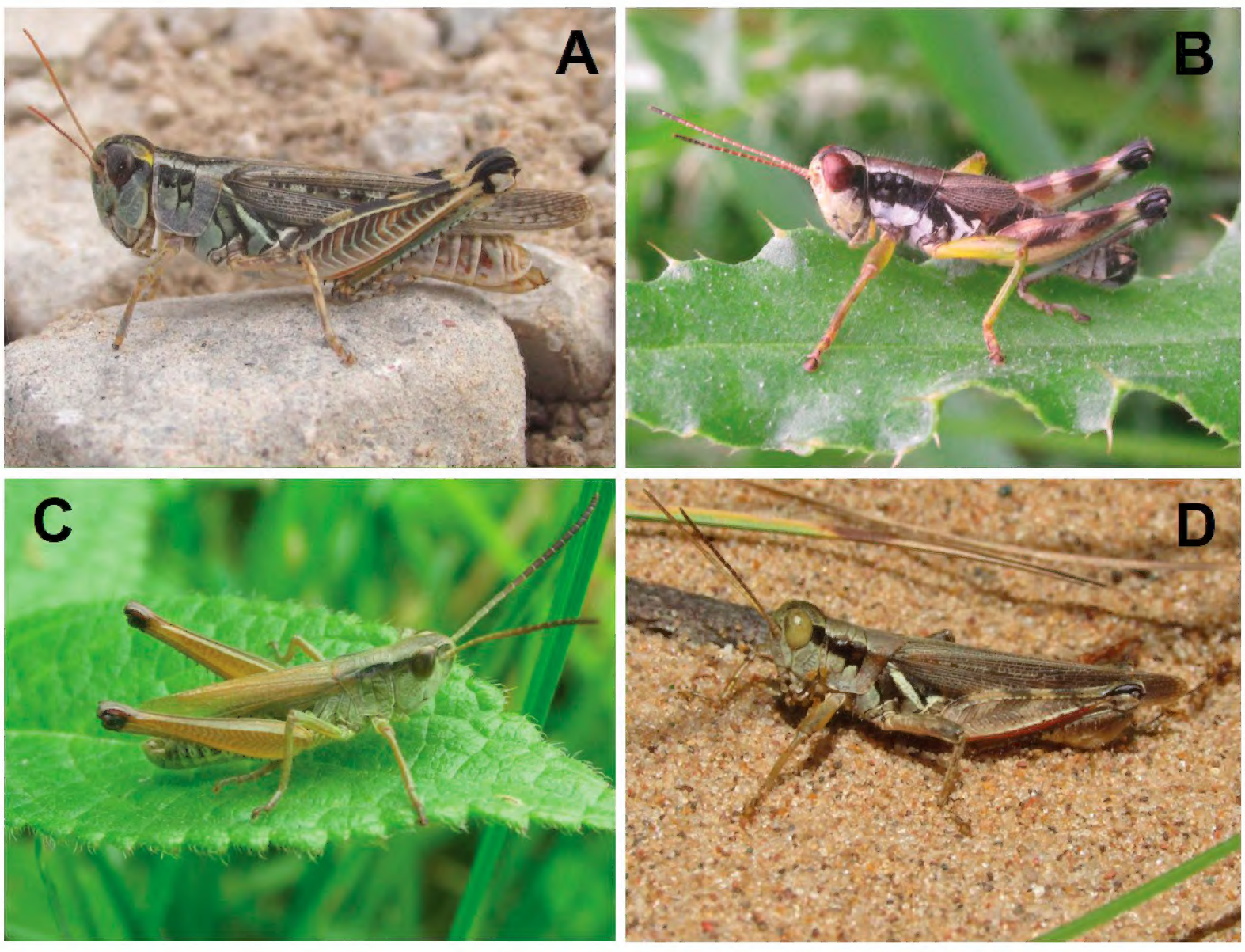

Fig. 3. A. *Melanoplus sanguinipes*, female, photographed in Dawes County, Nebraska on August 4, 2016; **B.** *Melanoplus viridipes*, male, photographed in Washington County, Wisconsin on June 6, 2022; **C.** *Pseudochorthippus curtipennis*, male, photographed in Pennington County, South Dakota on July 25, 2020; **D.** *Melanoplus foedus fluviatilis*, male, photographed in Juneau County, Wisconsin on July 11, 2017.

Harman et al. 2022). In addition, it is generally a rare to uncommon species throughout its range (Brust et al. 2008). The Wisconsin specimen most likely represents a single native specimen from a local population. It is unknown whether this species still occurs in Wisconsin, and because it usually occurs at low densities, it might still occur in the state undetected in small prairie remnants.

The single Wisconsin record for *Pardalophora phoenicoptera* (Burmeister, 1838) is of an immature specimen collected in Wood County in 1961 (Kirk and Bomar 2005). This is a southern species with the next nearest records to Wisconsin being over 200 miles to the south. While it is possible that an adult could perhaps stray into central Wisconsin, the occurrence of an immature specimen seems highly unlikely, especially with the lack of known adult specimens recorded from the state. This record should probably be considered questionable and possibly the result of mislabeling of the collection location.

Encoptolophus costalis (Scudder, 1862) is known from Wisconsin by a single specimen from Milwaukee County collected in 1906 (Kirk and Bomar 2005). The current known distribution of this species includes much of the Great Plains and the Rocky Mountains region. It appears to range eastward to central Minnesota. While this suggests that the Milwaukee record is questionable, it is possible that this species once occurred farther east than it currently does. As this record represents one of three questionable records from Milwaukee County between 1904 and 1906, it suggests a potential common origin of a mislabeled group of grasshopper specimens.

There is a single record for *Schistocerca alutacea* (Harris, 1841) for Milwaukee County from 1906 (Kirk and Bomar 2005). When Song (2004) conducted a taxonomic revision on the *Schistocerca alutacea* group and examined the single Wisconsin specimen, he included it as this species, despite the specimen being hundreds of miles north of its normal species distribution. Thus, based on the inclusion by Song (2004) and subsequent inclusion by Kirk and Bomar (2005), the *S. alutacea* record appears to be valid and most likely represents a migrant or displaced specimen. Likewise, there is a single Wisconsin record for *Schistocerca damnifica* (Saussure, 1861), a species with very limited dispersal ability (Harman et al. 2022). The *S. damnifica* specimen was collected in 1905. Considering that the furthest north that *S. damnifica* normally occurs is more than 400 km (240 mi.) from the southern Wisconsin border (iNaturalist 2024), this record seems highly questionable.

The single record for *Metaleptea brevicornis* (Johannson, 1763) is also somewhat questionable. Although Otte (1981) appears to include this record, this is primarily a species of the southeastern United States as well as Mexico and Central America (Otte 1981, BugGuide 2024). While there appear to be valid records for Michigan and northern Illinois (BugGuide 2024, iNaturalist 2024), the single Wisconsin record has no date recorded and is from Fond du Lac County (Kirk and Bomar 2005), relatively far north from the southern Wisconsin border. Still, as this species is predominantly found in wetlands (Otte 1981, BugGuide 2024), it is possible that it has been overlooked across southern Wisconsin.

The first Wisconsin record for *Trimerotropis pallidipennis* was obtained in 2022 (Brust 2023). *Trimerotropis pallidipennis* is found primarily across the southwestern United States and regularly disperses across most of Texas and Oklahoma into the western half of Kansas, Nebraska, and South Dakota (Otte 1984). The specimen most likely traveled on a significant weather front. It would not be unexpected to find this species in Wisconsin again in the future

The first records of *Melanoplus gracilis* (Bruner, 1876) in Wisconsin are presented here. Nine photos of this species from Wisconsin were found on iNaturalist, 3 in the nymph stage and 6

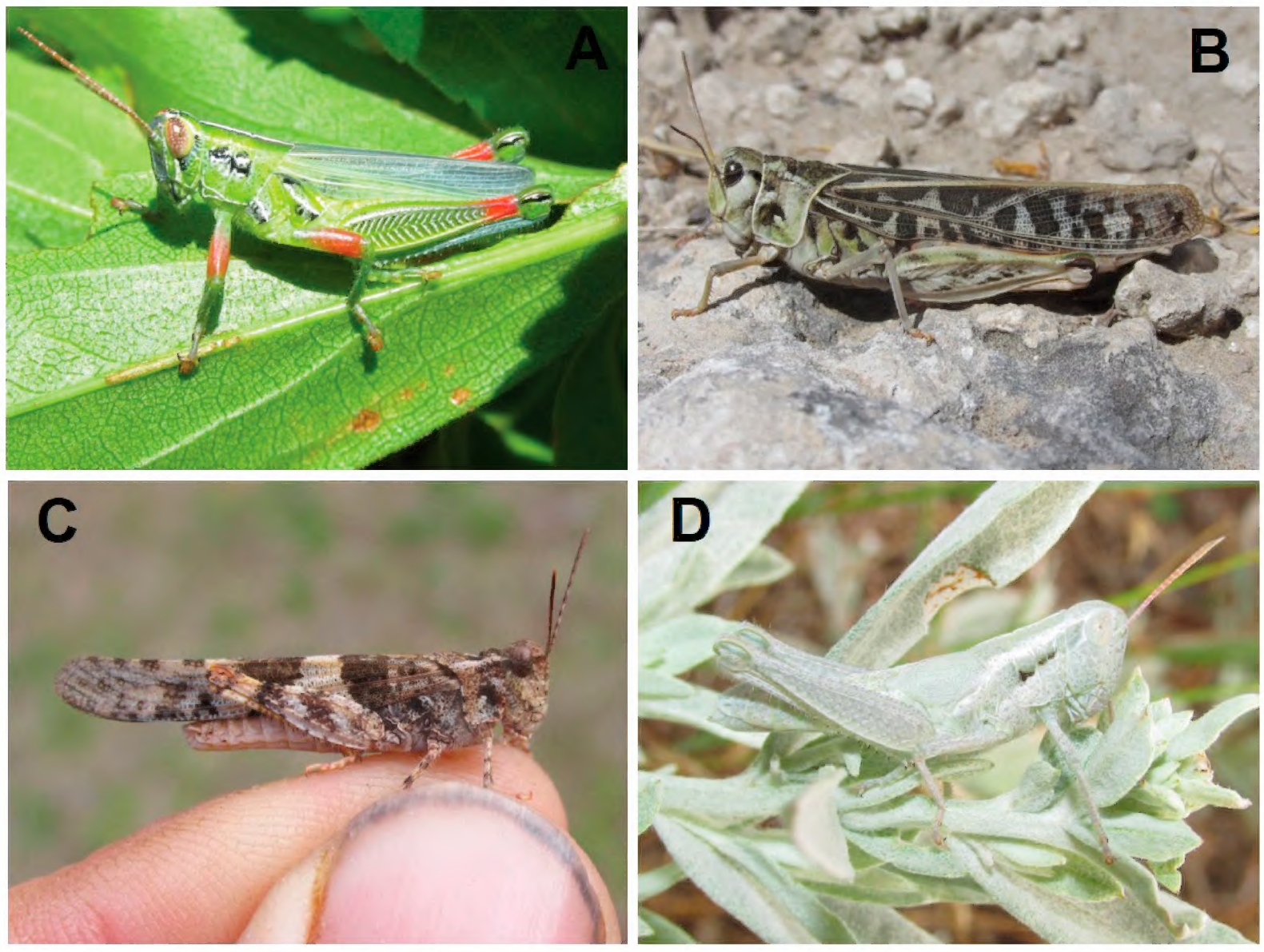

Fig. 4. A. *Hesperotettix viridis pratensis*, male, photographed in Cherry County, Nebraska on July 7, 2021; **B.** *Pardalophora haldemani*, female, photographed in Sioux County, Nebraska on June 23, 2020; **C.** *Trimerotropis pallidipennis*, male, photographed in Price County, Wisconsin on June 3, 2022; **D.** *Hypochlora alba*, female, photographed in Dawes County, Nebraska on July 21, 2015.

in the adult stage. These records are from three different counties—Ozaukee, Walworth, and Waukesha—with the two Ozaukee County records being the earliest (1 adult and 1 nymph, August 31, 2020). As this is a flightless species and that nymphs were photographed, this species clearly breeds in southeastern Wisconsin and likely occurs in other counties in the area.

Other acridid species to be watched for in Wisconsin include *Hypochlora alba* (Dodge, 1876) and *Campylacantha olivacea* (Scudder, 1875). *Hypochlora alba* has been photographed near Minneapolis, Minnesota, about 60 km (40 mi.) from the western border of Wisconsin (Zappa 2020). This grasshopper feeds mostly on *Artemisia ludoviciana* Nutt. and a few related *Artemisia* species, such as *A. tridentata* Nutt. (Pfadt 2002). *Artemisia ludoviciana* has been recorded from various locations across Wisconsin (USDA, NRCS 2024), so it is plausible that *H. alba* might occur in Wisconsin where sizable stands of *A. ludoviciana* occur. *Campylacantha olivacea* has been found in northern Illinois only 16 km (10 mi.) from the southern border of Wisconsin. As with *Hypochlora alba*, this grasshopper is also a host plant specialist. Although known to consume various sagebrushes (*Artemisia* spp.) in small quantities, it especially prefers ragweeds such as western ragweed (*Ambrosia psilostachya* DC.) (Mulkern et al. 1969), which is known to occur across most of Wisconsin (https://plants.sc.egov.usda.gov/home/plantProfile?symbol=AMPS). Targeted collecting efforts for these grasshoppers on their host plants in Wisconsin are needed.

The grasshopper species of Wisconsin are classified into two families, with all except *Romalea microptera* (which is a member of Romaleidae) being members of the family Acrididae. Within the Acrididae, four subfamilies are represented by Wisconsin species, with 16 Wisconsin species in the Gomphocerinae, 30 species in the Melanoplinae, 24 species in the Oedipodinae, and 4 species in the Cyrtacanthacridinae. Members of each of these subfamilies generally differ in morphology and food preferences.

Members of the Gomphocerinae mostly feed on grasses and sedges and are often referred to as slant-faced grasshoppers, as the mouth is usually located below and behind the eyes. Some members of this family are known to cause significant damage to rangeland grasses across western North America (Pfadt 2002). Many members of this subfamily were likely more widespread and abundant in Wisconsin prior to European settlement and the loss of grasslands due to row crop agriculture. Members of the genus *Stethophyma* are likely poorly sampled in Wisconsin, as they occur in wetlands and are thus not commonly encountered.

Fig. 5. *Campylacantha olivacea*, female, photographed in Dawson County, Nebraska on September 5, 2021.

Members of the subfamily Melanoplinae often feed on forbs and are commonly referred to as spur-throat grasshoppers due to a small pointed projection that extends ventrally between the bases of the forelegs. This is the most diverse subfamily in Wisconsin, which is perhaps related to the diversity of forb species in the state. While several species likely feed only on a few plant species, the diets of many of these species remain unknown. Due to most species preferring forbs, the economically important members of this group primarily damage crops and gardens rather than rangeland grasses. However, *Melanoplus sanguinipes* (Fabricius, 1798) is an exception, as it prefers to eat grasses and is known to sometimes cause economic damage (Pfadt 2002). This subfamily also includes some species that occur among forest understory growth as well as some arboreal species that appear to spend most of their lives in trees or shrubs.

Members of the subfamily Oedipodinae are somewhat variable in diet and are commonly referred to as band-winged grasshoppers. Some species appear to feed mostly on grasses, while other species feed mostly on forbs. However, the diets of most North American species in this subfamily remain unknown. The common name of this group is derived from most members having colorful hindwings, most often yellow or red with a black band on each hindwing. Most members of this group spend most of their time on the ground and are often reluctant to climb vegetation (Pfadt 2002, pers. obs.). Consequently, many species possess colors that closely match local soils or rocks and are often found mostly in areas with sparse vegetation. Some members of this subfamily are only associated with certain substrates such as rocks, sand, or gravel, and some prefer an abundance of lichens on the substrate.

Members of the subfamily Cyrtacanthacridinae often have varied diets and are commonly referred to as bird grasshoppers. The common name stems from their very strong flight ability and tendency to fly for long distances. Most species appear to feed on forbs, shrubs, or trees of various kinds. There are only four species recorded from Wisconsin in the subfamily, all belonging to the genus *Schistocerca*. Only one of the four Wisconsin species appears to breed in the state, with the other three species likely only occurring as strays from states further south.

It is worth noting that several new county records were added to iNaturalist in 2024; these records should be added to a future manuscript on Wisconsin grasshoppers. It is expected that numerous new county records will be posted to iNaturalist and BugGuide in future years.

Suppl. material 1 lists both historical and new grasshopper records for Wisconsin. The historical data were derived from Kirk and Bomar (2005) and its associated dataset through the help of Terrell Hyde. New records are listed in bold. Suppl. material 2 includes county-level range maps for Wisconsin Acridids. Dark gray indicates a record prior to 2005, while light gray indicates a new record included in this manuscript after 2002. Suppl. material 3 includes all new records acquired from BugGuide and iNaturalist.

Acknowledgements

We would like to thank the contributors and communities at BugGuide and iNaturalist We also thank Kathy Kirk, posthumously, for her work on the Guide to the Grasshoppers of Wisconsin, as well as her continued work long after its publication. We also thank Kathy Kirk, posthumously, for her work on the Guide to the Grasshoppers of Wisconsin, a baseline upon which future grasshopper distribution data could be built, as well as her continued work long after its publication

References

Banfill JC, Brusven MA (1973) Food habits and ecology of grasshoppers in the Seven Devils Mountains and Salmon River breaks of Idaho. Melanderia 12: 1–32.

Brust ML (2023) Northeastward occurrence for the western grasshopper *Trimerotropis pallidipennis* (Burmeister) (Acrididae: Oedipodinae). Great Lakes Entomologist 56: 239–245. https://doi.org/10.22543/0090-0222.2457

Brust ML, Harman, AL (2020) New distribution records for *Melanoplus punctulatus* (Scudder) in western Nebraska and notes on behavior. Transactions of the American Entomological Society 146: 235–238. https://doi.org/10.3157/061.146.0106

Brust ML, Hoback WW, Wright RJ (2008) A synopsis of Nebraska grasshopper distributions. Journal of the Kansas Entomological Society 81: 208–255. https://doi.org/10.2317/JKES-801.22.1

Brust ML, Lindroth EJ, Hoback WW, Wright RJ, Hanford KJ, Foster JE (2010) Morphological and genetic analyses in the *Melanoplus packardii* group (Orthoptera: Acrididae). Journal of Orthoptera Research 19: 281–288. https://doi.org/10.1665/034.019.0215

BugGuide (2024) BugGuide. https://bugguide.net/node/view/15740 [accessed March 12, 2024]

Cigliano MM, Braun H, Eades DC, Otte D (2024) Orthoptera Species File [10.17.2024]. http://orthoptera.speciesfile.org/

Harman AJ, Brust ML, Royer TA, Mulder P, Hoback WW (2022) New state and county records of short-horned grasshoppers (Orthoptera: Acrididae and Romaleidae) in Oklahoma. Southwestern Entomologist 47: 1–26. https://doi.org/10.3958/059.047.0101

iNaturalist (2024) iNaturalist. https://www.inaturalist.org [Accessed 29 February 2024]

Joern A (1985) Grasshopper dietary (Orthoptera: Acrididae from a Nebraska sandhills prairie. Transactions of the Nebraska Academy of Sciences 13: 21–23.

Kirk K, Bomar CR (2005) Guide to the grasshoppers of Wisconsin. Bureau of Integrated Science Services, Wisconsin Department of Natural Resources, Madison, WI, 154 pp.

Mulkern GB, Pruess KP, Knutson Hagen AF, Campbell JB, Lambley JD (1969) Food habits and preferences of grassland grasshoppers of the north central Great Plains. North Dakota Agricultural Experiment Field Station, North Central Regional Publication No. 196, 1–32.

Otte D (1981) The North American grasshoppers, Volume I, Acrididae: Gomphocerinae and Acridinae. Harvard University Press, Cambridge, MA, 368 pp.

Otte D (1984) The North American Grasshoppers, Volume II, Acrididae: Oedipodinae. Harvard University Press, Cambridge, MA, 366 pp.

Pfadt RE (2002) A Field Guide to Common Western Grasshoppers. 3rd edition. Wyoming Agricultural Experiment Station. Bulletin 912: 1–288.

Rehn JAG, Rehn WH (1943) The North American locust genus *Paratylotropidia* (Orthoptera, Acrididae: Cyrtacanthacridinae). Transactions of the American Entomological Society 69: 33–60.

Song H (2004) Revision of the Alutacea group of the genus *Schistocerca* (Orthoptera: Acrididae Cyrtacanthacridinae). Annals of the Entomological Society of America 97: 420–436. https://doi.org/10.1603/0013-8746(2004)097[0420:ROTAGO]2.0.CO;2

Sword GA, Senior LB, Gaskin JF, Joern A (2007) Double trouble for grasshopper molecular systematics: Intra-individual heterogeneity of both mitochondrial 12S-valine-16S and nuclear internal transcribed spacer ribosomal DNA sequences in *Hesperotettix viridis* (Orthoptera: Acrididae). Systematic Entomology 32: 420–428. https://doi.org/10.1111/j.1365-3113.2007.00385.x

Uekert DN, Hansen RM (1971) Dietary overlap of grasshoppers on sandhill rangeland in northeastern Colorado. Oecologia 8: 276–295. https://doi.org/10.1007/BF00346475

University of Florida Entomology and Nematology Department (2021) Eastern lubber grasshopper – *Romalea guttata* (Houttuyn). https://entnemdept.ufl.edu/creatures/orn/lubber.htm/ [Accessed on 10.17.2024]

USDA, NRCS (2024) The PLANTS Database (http://plants.usda.gov, 03/12/2024). National Plant Data Team, Greensboro, NC USA.

Wisconsin Prescribed Fire Council (2018) Tall Grass Prairie Prescribed Fire Fact Sheet. https://prescribedfire.org/wp-content/uploads/2018/02/WIPFC-TallGrassPrairieFactSheet.pdf/ [Accessed on 10.17.2024]

Supplementary material 1

Author: Mathew L. Brust, Charles Bomar, Alexander J. Harman
Data type: docx
Explanation note: County-level records for Wisconsin Acrididae.
Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0/). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.
Link: https://doi.org/10.3897/jor.34.124604.suppl1

Supplementary material 2

Author: Mathew L. Brust, Charles Bomar, Alexander J. Harman
Data type: docx
Explanation note: County-level distribution maps for Wisconsin grasshoppers.
Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0/). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.
Link: https://doi.org/10.3897/jor.34.124604.suppl2

Supplementary material 3

Author: Mathew L. Brust, Charles Bomar, Alexander J. Harman
Data type: docx
Explanation note: All new records acquired from BugGuide and iNaturalist.
Copyright notice: This dataset is made available under the Open Database License (http://opendatacommons.org/licenses/odbl/1.0/). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.
Link: https://doi.org/10.3897/jor.34.124604.suppl3